BULLETIN NO. 73

JULY, 1945

663.1-10
660.11-12
CA2 ALA 2
1945B73
ALBERTA LEGISLATURE LIBRARY
3 3398 00411 1703

The Alberta Dairy Farm Business

BASED ON A REPORT OF THE SURVEY CONDUCTED BY
ALBERTA DEPARTMENT OF AGRICULTURE
DOMINION DEPARTMENT OF AGRICULTURE
UNIVERSITY OF ALBERTA

TABLE OF CONTENTS

Page No.

1. Acknowledgment and Introduction 3
2. Summary 4
3. Dairy Requirements as Percentage of Gross Cost 5
4. Variation in Labour Earnings 7
5. Production per Cow 9
6. Feeding Efficiency 11
7. Crop Efficiency 12
8. Labour Efficiency 14
9. Capital Efficiency 16
10. Size of Business 17
11. Combination of Enterprises 20
12. Combined Effect of Efficiency Factors 21

3/L Publication # 73

4L

The Alberta Dairy Farm Business

« « » »

ACKNOWLEDGMENT

The information contained in this bulletin is based on a study of records kept on Alberta farms producing churning cream, cheese milk, and milk for concentration, by annual periods from June 1st, 1939, to May 31st, 1943. The study was conducted by the Economics Division, Department of Agriculture, Ottawa; the Alberta Department of Agriculture, Edmonton; the Board of Public Utility Commissioners, Edmonton; and the Department of Political Economy, University of Alberta, Edmonton. The manuscript was prepared by H. L. Patterson, Economics Division, Department of Agriculture, Ottawa, and reviewed by Prof. Andrew Stewart, Department of Political Economy, University of Alberta, and D. H. McCallum, Dairy Commissioner, Department of Agriculture, Edmonton.

CANADIAN OFFICIAL PUBLICATIONS COLLECTION
DE PUBLICATIONS OFFICIELLES CANADIENNES
NATIONAL LIBRARY BIBLIOTHÈQUE NATIONALE CANADA

LEGISLATURE LIBRARY
APR 13 2015
EDMONTON

Authorized by
Hon. D. B. MacMillan,
Minister of Agriculture.

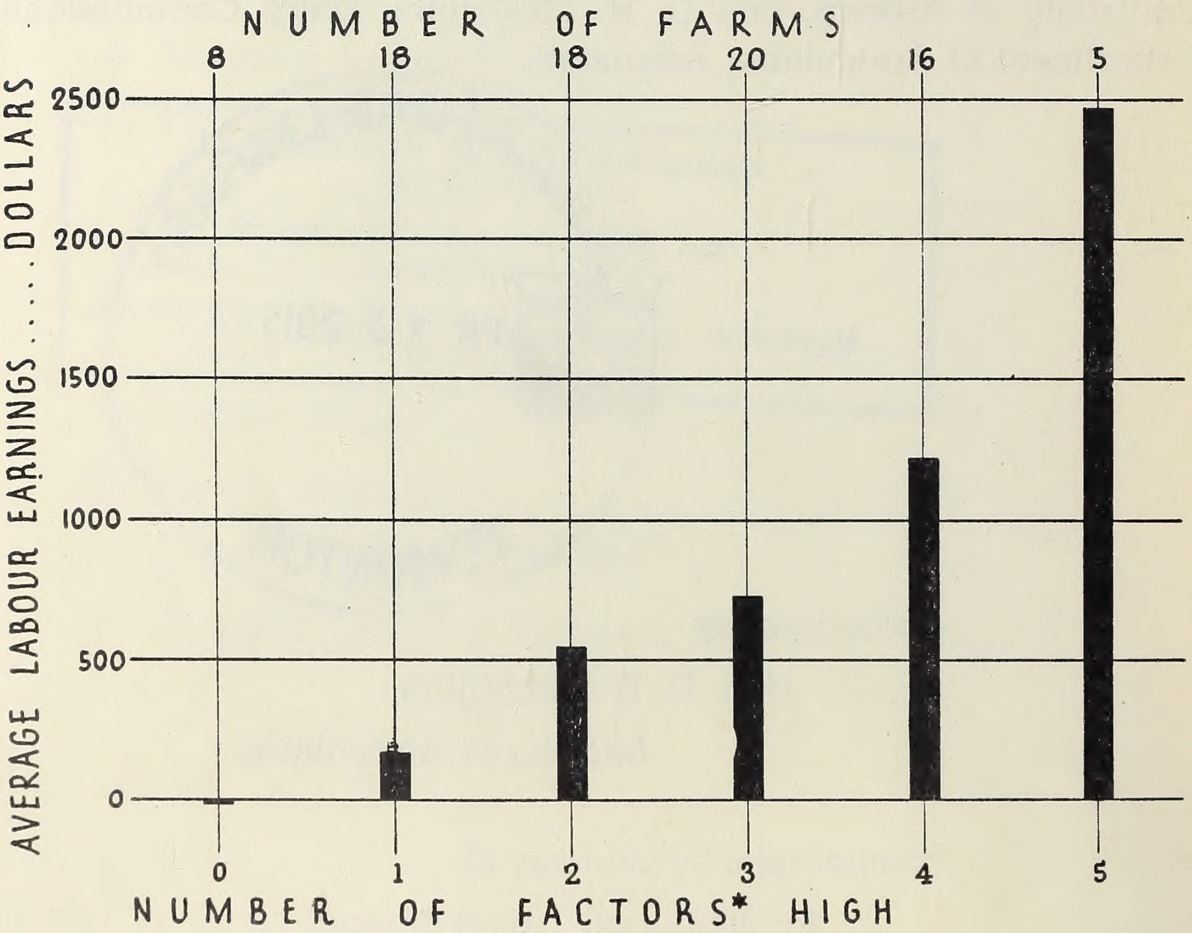
Photographs by courtesy of
Publicity and Travel Bureau,
Department of Trade and Industry,
Edmonton, Alberta.

SUMMARY

IN order to obtain good earnings, Alberta dairy producers should have as large a unit as possible of the enterprise which available information indicates is the best paying for their district and for their type of soil. The best way to obtain this information would be through supervised farm accounts. Around this enterprise they should develop a combination of enterprises that will utilize labour, capital and the by-products of the other enterprises to best advantage. Dairying usually fits well in such a combination.

High earnings are associated with the following factors:*— 1. High production per animal; 2. High yields per acre; 3. High output per worker; 4. High receipts in relation to investment, and 5. A farm business above average in size.

EFFECT OF THE ABOVE FACTORS* ON OPERATOR'S EARNINGS
[85 Alberta Cream Farms 1941-42]



The average should be considered as a minimum objective rather than as a satisfactory point at which to rest on one's laurels. Approximately half the farms in any group are above average in any one factor. On the basis of averages found in the Alberta Study, the minimum objectives for producers of churning cream, cheese milk, or milk for condensing, should be at least 220 pounds of butterfat produced for each cow in the herd. This should be possible with about 1,500 pounds of concentrates (including grain) fed per cow per year.

The minimum objective for hog production would be seven hogs reaching market per single litter, or eleven hogs reaching market per brood sow per year. The minimum crop yields can be obtained from the district averages in any one year. The output per worker can be compared with known facts about what others can accomplish in the district. In the dairy there should be a pound of butterfat produced or more, for every man hour of daily chores. At prices prevailing in 1943, there should be at least $1,700 of cash receipts for each twelve months of work performed on the whole farm. There should be enough cash receipts to equal investment in four years, or that is, the cash receipts in one year should be at least 25% of the investment. The farm should have approximately 200 acres of crop land or better, although this will vary with the type of farming, the moisture zone and soil type. There was a normal spread of over $7,000 between the yearly earnings on the high and low farms in any one group, and this spread was associated with proficiency in the above factors.

◆

THE DAIRY FARM BUSINESS IN ALBERTA

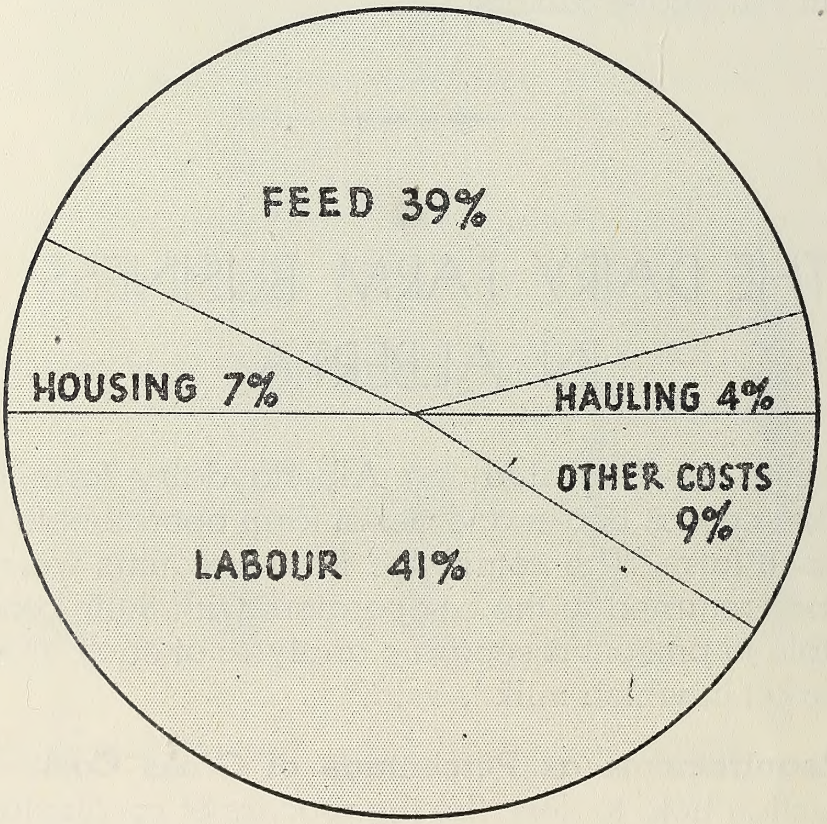
The method used in studying Alberta dairy farm businesses was to supply account books and assist farm operators to keep them by calls to each farm. The completed farm accounts were analyzed and summaries returned to the co-operators with their books. It was found desirable to present a separate analysis of each group according to the market in which milk is sold.

Dairy Requirements as Percentage of Gross Cost.—The costs of milk production help to describe the process of production because they bring all the requirements to a common denominator, namely the cost in dollars. The importance of each item can then be judged by the proportion that it represents. The main items of cost in percentages of total cost, 1942-43, are presented in Table 1.

Table 1. Percentage Distribution of Gross Costs of Milk Production on Farms by Type of Market, 1942-43.

Items	Edmonton Inspected Cream	Northern Churning Cream	Calgary Inspected Cream	Red Deer Condensery
	%	%	%	%
Concentrates fed	14.7	14.3	14.0	16.8
Dry roughages fed	17.2	17.3	17.2	15.7
Other feeds (including pasture)	6.3	5.5	5.0	4.6
Total Feeds	38.2	37.2	36.2	37.1
Labour	40.9	43.3	44.4	43.8
Use of buildings	5.6	4.8	4.7	3.9
Marketing	4.3	3.7	3.7	3.8
All other	11.0	11.0	11.0	11.4
GROSS COST	100.0	100.0	100.0	100.0
Credit Items	30.0	31.0	20.7	16.0
Net Cost	70.0	69.0	79.3	84.0

PERCENTAGE DISTRIBUTION OF
GROSS COSTS OF MILK PRODUCTION
CHURNING CREAM FARMS
1939-1940



The gross cost is always taken as 100 per cent. The income received from the sale of old cows and veal calves is treated as a credit to the dairy enterprise and deducted from gross costs to obtain the net cost. Other credits to the dairy are skim-milk fed to other than dairy calves and prize money. These credit items are deducted from gross cost and the remainder or net cost is the cost which is divided by the number of pounds of butterfat sold or used in the house to get the cost per pound. The credit items are a much higher percentage of gross cost on cream farms than on any of the farms selling milk as cheese milk or for condensing. The cream producers had lower gross costs and the same credits would equal a higher percentage. In addition to this, where skim-milk was fed to stock other than dairy stock, it was credited directly to the dairy herd.

The highly variable percentages are those representing feeds, labour and marketing cost. The use of buildings and the items grouped under "All Other" costs are remarkably similar in all groups. Stated differently it is the physical requirements of dairy production, whose value varies most between different types of dairy farms or from year to year.

In all studies based on farm accounts, some operators have been found who did not receive enough income to give them any return for their time, let alone interest on the capital invested in their farms. Yet, these farmers continue to operate. The explanation is to be found in the legitimate farm expenses on which payment may have been deferred. In correct farm accounting an allowance is made in expenses for depreciation on buildings and equipment, which must be replaced sometime if the operator is not to lose his investment, yet the operator may not have paid out anything for maintenance of buildings during the year the records were kept. Another item allowed for in farm expenses is unpaid family labour. Normally a son does not work at home indefinitely without hope of assistance to start for himself. In this case he may cost his parents many times what they would pay a hired man. The practise is to charge the farm with what the family labour could have been hired for, but again the outlay may have been deferred. Another item of legitimate cost is interest on investment, which may not involve any cash outlay. Where a farm operator has been forced to draw on these resources to maintain his current position he has actually been depreciating his capital and exploiting his human resources. Should this condition continue indefinitely he will eventually have neither capital nor labour to continue operations. However, considerable variation in the results obtained by dairy farm operators was found, as may be seen in Table 2.

VARIATION IN LABOUR EARNINGS

The prices paid for farm products are an important cause of variation in labour earnings obtained in different years and in different types of markets. However, the widest variation in results obtained by farm operators frequently comes in the same year and in the same market group. This latter type of variation is due to the organization and management of the individual farms. Variation due to price is a group problem. The individual farm operator can

Table 2. Summary of Labour Earnings, Cost per Pound of Butterfat and Dairy Returns per Hour of Labour.

	Churning Cream Farms	Northern Cheese Milk Farms	Irrigated Cheese Milk Farms	Condensery Patron Farms
	$	$	$	$
Labour Earnings: *1				
Averages 1939-40	134	1	....	....
1940-41	694	579	....	....
1941-42	852	653	1,077	....
1942-43	1,307	....	....	755
The highest labour earnings	4,921	5,508	2,890	3,130
The lowest labour earnings	−3,625	−1,352	−319	−1,820
Milk Cost per Pound of Butterfat: †2				
Averages 1939-40	.356	.376	....	....
1940-41	.312	.328	....	....
1941-42	.372	.401	.348	....
1942-43	.540	....	....	.640
The highest cost per pound of butterfat	.74	.89	.60	1.34
The lowest cost per pound butterfat	.12	.15	.09	.35
Dairy Returns per Hour of Labour: ‡3				
Averages 1941-42	.19	.20	.38	....
1942-43	.19	....	....	.21
The highest returns per hour	.64	.49	.78	.57
The lowest returns per hour	−.14	−.09	−.06	−.30

*1 Labour earnings is what is left for the operator after all expenses have been met including interest on investment. It includes value of products used in the house and the use of the house at eight per cent of its value. For detailed calculation see farm summaries below.

†2 The cost per pound of butterfat is the net cost of milk production alone, or the total cost minus the credits to the dairy, divided by the total pounds of butterfat sold and used in the house. The credits include herd increase, skim-milk and money.

‡3 Dairy returns per hour of labour, are the net returns from the dairy enterprise, plus the cost of labour used in the dairy divided by the hours of dairy chores.

Table 3. The Operators Labour Earnings Are Based on the Entire Farm and are Calculated as Shown Below.

	Average 20 Cheese Milk Farms 1941-42	Average 30 Churning Cream Farms 1942-43	Average 49 Condensery Milk Farms 1942-43
	$	$	$
Cash receipts	2,825	4,116	3,549
Inventory increases	535	1,155	921
Total farm receipts	3,360	5,271	4,470
Total current expense	1,733	2,325	2,425
Capital purchases and improvements	418	867	561
Inventory decreases	303	348	364
Total farm expenses	2,454	3,540	3,350
Farm income	906	1,732	1,120
Less interest on investment at 5%	568	769	667
Equals labour income	338	963	453
Plus use of house at 8% of its value	100	108	87
Plus farm products used in the house	215	236	215
EQUALS LABOUR EARNINGS	653	1,307	755
Family labour value *1	617	616	678

*1 Family labour value (excluding the operator) is included in current expense and should be added to operator's labour earnings to get the family labour earnings.

do very little about it except where price is affected by quality of products. Variation due to organization and management can only be controlled by the individual farm operator. The wide variation in earnings indicates the importance of knowing its causes. Knowing this will help in understanding the methods that must be used to obtain higher earnings.

Higher net earnings may be obtained by an increase of receipts or a decrease of expenses, or both. Farm receipts must come from the sale of live stock and their products or from crops. Farm expenses all represent an outlay of labour or of capital. Capital in this case includes both current capital to meet day to day expenses and the carrying charges on longer time investment, such as land and machinery.

The amount of live stock, crops, labour and capital which a farm operator has largely determines the size of the business. While the effect of size operates through other factors, it has some peculiarities that can be explained better if treated as a separate factor. Combination of enterprises is similar to size, in that its effect on labour earnings must be registered through live stock, crops, labour or capital, and it is discussed separately in order to consider all the applications of the principles involved. Therefore, the analysis is presented as the relation to labour earnings and cost per pound of butterfat of efficiency in the use of: (1) live stock; (2) crops; (3) labour; (4) capital. This is followed by a discussion of the relation of earnings to (5) size of business, and (6) combination of enterprise.

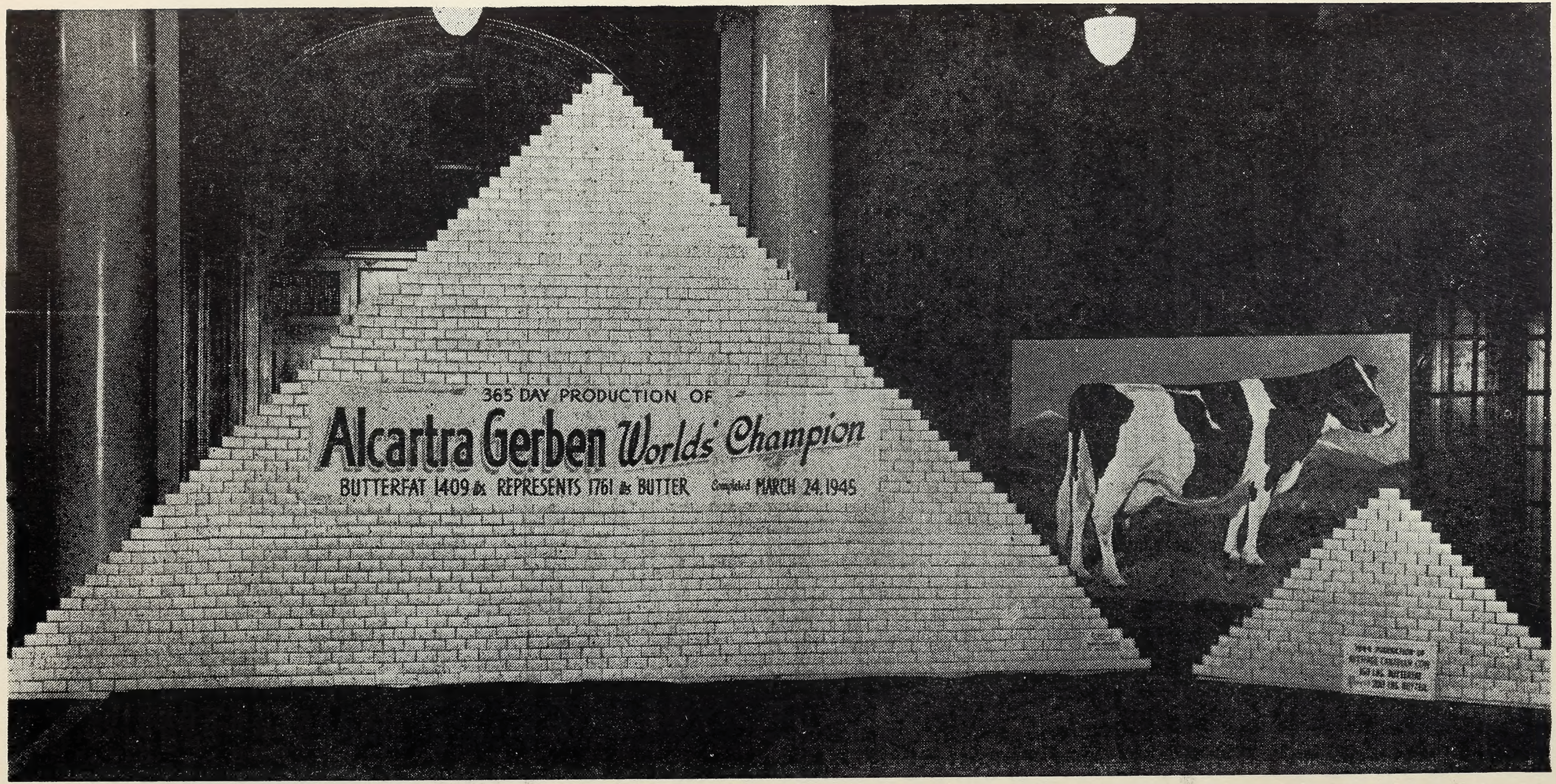
LIVE STOCK

Production per Cow:—On specialized dairy farms, one of the most important indications of efficiency with live stock is the butterfat produced per cow. The relation of production per cow to labour earnings and to feed fed in the 1941-42 account year is shown in

Table 4. Relation of Production per Cow to Feeds Fed, 1941-42.

Butterfat per Cow	Number of Farms	Average Labour Earnings	Concentrates Fed per per Dairy Animal Unit *1	Roughage Fed per Dairy Animal Unit	Value of Feed fed per Dairy Animal Unit
Lbs.		$	Lbs.	Tons	$
Edmonton Churning Cream and Cheese Farms:					
Less than 180	21	591	658	2.14	24
180 to 219	31	741	925	2.36	28
220 to 259	20	776	1,375	2.45	36
260 or more	20	1,286	1,492	2.25	42
Rosemary and Coaldale Cheese Farms:					
Less than 230	28	851	563	1.60	20
230 or more	22	1,366	1,508	2.20	31

*1 "Dairy Animal Unit" means one cow or its equivalent. One heifer over 1 year of age equals 2/3 of a unit, and 1 calf equals 1/3 of a unit.


365 DAY PRODUCTION OF
Alcartra Gerben World's Champion
BUTTERFAT 1409 lbs. REPRESENTS 1761 lbs. BUTTER
Completed MARCH 24.1945

Butterfat per cow is one of the most important indications of live stock efficiency. "Alcartra Gerben", Alberta cow and world champion butterfat producer, gave 8.8 times the butterfat of the Average Canadian cow.

Table 4. Although feed cost increased with higher production per cow, farms in the groups with highest producing cows had the highest labour earnings.

Even on specialized dairy farms butterfat per cow is not an entirely satisfactory measure of efficiency with live stock. The cost of the feed used is an important consideration. In Table 5 is given the returns per $100 worth of feed fed to the dairy herd and its effect on labour earnings and cost per pound of butterfat. Feed represents about 43 per cent of the cost of Alberta whole-milk production, so that it is to be expected that efficiency in the use of feed would be closely related to cost per pound of butterfat as indicated in Table 5. The returns per $100 worth of feed in any one year and in one market group are affected by the rate of production per cow, the local prices of feeds, and the types of feed fed.

Table 5. The Effect of Efficiency in the Use of Dairy Feed, 1942-43.

Returns per $100 Worth of Feed Fed	Number of Farms	Average Labour Earnings	Cost per Pound of Butterfat	Value of Feed per Dairy Animal Unit	Butterfat Sold per Cow *1	Returns per Dairy Animal Unit	Total Milk Receipts per Cow
$		$	cents	$	Lbs.	$	$
Cream Farms:							
Less than 200..	21	1,248	72	48	191	73	81
200 to 299..........	22	1,369	49	36	225	86	97
300 or more......	5	2,089	39	25	237	101	96
Condensery Farms:							
Less than 200..	21	345	80	52	189	77	94
200 or more......	28	1,064	56	38	234	102	120

*1 "Butterfat Sold Per Cow" includes butterfat used in the house but not that fed to calves.

Feeding Efficiency.—One of the considerations in efficient feeding of dairy cattle is the quantity of pasture available. The productivity of pasture varies greatly and may deteriorate rapidly during a hot, dry summer. The effect of having an abundance of pasture available in 1941-42 is given in Table 6.

Table 6. The Effect of Pasture Available per Cow, 1941-42.

Acres of Adjusted *1 Pasture per Animal Unit	Number of Farms	Average Labour Earnings	Cost per Pound of Butterfat	Animal Units of Cows per Farm	Value of Feed Fed per Unit of Dairy Stock	Average Butterfat Sold per Cow	Feed Cost per Pound of Butterfat
		$	cents		$	Lbs.	cents
Churning Cream and Cheese Farms:							
Less than 3............	31	751	40.0	11.6	29	188	24.2
3 and 4..................	32	765	37.0	9.6	29	190	25.2
5 or more..............	29	995	34.7	8.3	33	199	26.0
Rosemary and Coaldale Cheese Farms:							
Less than 2............	19	1,042	33.2	7.6	26	219	18.1
2 or more..............	31	1,099	33.7	5.7	23	213	17.5

*1 One acre of adjusted pasture is equivalent to 1 acre of seeded pasture, or 3 acres of rough open land pasture, or 10 acres of bush land pasture.

Where acres of pasture per dairy animal unit were highest the labour earnings were highest, and in the northern group the cost per pound of butterfat was lowest. The 1941-42 year was normal in the north, but in the southern part of the Province, in the area of the Rosemary and Coaldale cheese factories there was more than the usual amount of summer rainfall, and the effect of additional acres of pasture was much less. The following year the summer rainfall was unusually high all over the Province and no effect from extra acres of pasture was discernible in any area of Alberta. Pasture appears to be an important problem only in dry years.

Another comparison made was the feeding of straw versus no straw fed inside the barn. When the farms were sorted on the percentage of food nutrients supplied by straw, the cream shipping farms that fed over 20 per cent of their nutrients as straw had costs of four cents less per pound of butterfat than the average of those farms where no straw was fed. Where it is abundant and close to the barn, straw is usually a very cheap source of digestible nutrients. A stock-man could not afford to pay very much for it.

One method of improving production per cow is to have the cows freshen in the fall. Table 7 illustrates the effect of producing more cream in winter. The farm groups shipping the most in winter had the highest labour earnings. Their costs per pound of butterfat were surprisingly similar to those of the farms producing mainly in summer. While winter producers fed more concentrates the added cost was offset by higher production per cow and a better distribution of labour through the year. The winter producers usually let their cows dry off in harvest time.

Table 7. The Effect of Percentage of Milk Shipped in Winter.

Per cent of Milk Shipped in Winter	Number of Farms	Average Labour Earnings	Cost per Pound of Butterfat	Receipts per Pound Butterfat	Concentrates fed per Dairy Animal Unit	Butterfat Produced per Cow
		$	cents	cents	Lbs.	Lbs.
110 Churning Cream and Cheese Farms:						
Below 27 per cent	24	390	32.3	22.4	683	189
27 to 34 per cent	21	482	33.5	24.4	911	212
35 to 42 per cent	29	602	31.8	25.7	924	221
43 per cent or more	36	1,015	30.6	27.0	1,257	231

CROPS

The usual method of appraising crop efficiency is by yield per acre of crops. However, crop yield per acre varies considerably according to the soil and season. Therefore, the correct comparison is with similar farms in the same district, in the same year. This can be done with a crop index.

Crop Index.—Crop index expresses the yields per acre on a given farm as a **percentage of average,** with the average taken as 100. For example, a crop index of 120 would mean that a farm had yields 20 per cent above the average of the area chosen as a unit. The farms were sorted according to their crop index and the result is shown in Table 8. It will be seen that as crop yield index increased in each market group, the labour earnings also increased markedly. As crop yield index increased, average crop acres and crop acres as a percentage of total acres, decreased. These relationships have been found in all market groups.

Table 8. The Effect of Crop Yields as Measured by Crop Index.

Crop Index	Number of Farms	Average Labour Earnings	Crop Acres as Percentage of Total Acres	Crop Index	Average Crop Acres
		$	%	%	
All Cream Farms, 1942-43:					
Less than 110	24	1,132	56	80	318
110 or more	24	1,650	68	132	236
All Condensery Farms, 1942-43:					
Less than 100	28	596	62	80	280
100 or more	21	966	58	118	179

Table 9. Use of Land Not Cropped, 1941-42.

Cows per Farm	Number of Farms	Crop Land	Seeded Pasture	Open (Wild) Pasture	Woods Pastured	Woods Not Pastured	Yards Roads and Fences	Total Acres
No.		Ac.	Ac.	Ac.	Ac.	Ac.	Ac.	
Edmonton Churning Cream and Cheese Farms:								
Less than 7	28	190	10	29	70	1	6	306
7 to 9	26	184	9	36	46	17	6	298
10 to 12	16	195	14	55	39	9	5	317
13 to 15	13	297	34	123	84	29	6	573
16 or more	9	330	24	87	74	5	7	527
Rosemary and Coaldale Cheese Farms:								
Less than 5	15	97	9	19	....	7	2	134
5 to 7	21	131	6	44	....	16	4	201
8 to 10	8	144	11	84	....	164	3	406
11 or more	6	126	14	133	....	15	4	292

It may be seen in Table 9 that seeded and open uncultivated pasture represents a considerable area of land that could be tilled. The usual practice is to leave or seed the least desirable land for pasture.

This suggests that one reason why some farm operators obtain higher crop yields is that they may select their crop land more carefully and use the poorer land for pasture; having more pasture and animals to utilize it, they would need more soil improving crops for winter feed and would have more manure for the land.

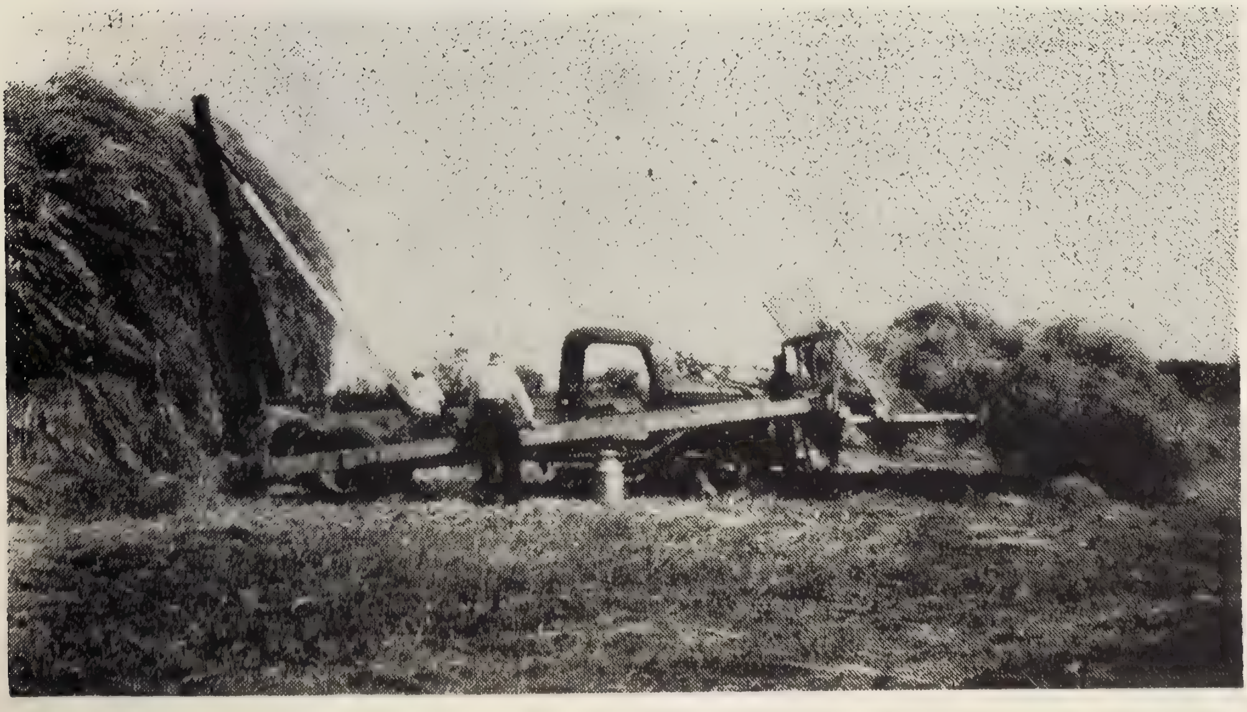
Milking equipment moved on wheels will save time and labour each day in handling and recording milk production.

Labour Efficiency.—There are many ways by which efficiency in the use of labour may be measured. In the case of specialized dairy farms the number of cows per man may be used. In the Alberta Dairy Study herd average production per cow varied all the way from 125 pounds of butterfat to 454 pounds of butterfat per cow. Since this increase of production would involve some extra care in the form of more inside feeding and caring for the animals, the number of cows alone does not fully measure the accomplishments of labour in the dairy.

A measure which does take intensity of production into account, is the hours of chores required per pound of butterfat produced. The effect of labour efficiency in the dairy as measured by hours of chores per pound of butterfat is given in Table 10. It will be seen that the hours of chores per pound of butterfat bore a very close relation to cost per pound of butterfat, and also to the operator's labour earnings.

High labour efficiency is found where buildings are conveniently arranged to have the wagon or spreader drive through for cleaning and to get the feed stored as closely as possible to where it will be

A milker saves labour during the peak load of the day.



An overshot stacker saves labour and may produce better hay by getting it up on time.

fed. Some farmers, with a view to improving their labour efficiency, have drawn a map of the farm to scale, then a plan of the buildings, and last but not least a plan of the season's work to be done. In every case such plans will reveal considerable wasted time and effort. This wasted effort can be eliminated by rearranging field lines, reorganizing buildings, storing feed in convenient places, and piping water to where it is needed. Such changes take time and thought, but as Table 10 indicates, the reward is great. *1

*1 In bulletin 503, "Labour Saving Through Farm Job Analysis", Vermont, June, 1942, it was indicated, that on a farm that already looked efficient, they were able to reduce chore time by changes in the interior of the barn and by changes of the order in which work was done; from 5 hours and 44 minutes per day, to 3 hours and 39 minutes; and the distance travelled from 3¼ miles per day to 1¼ miles travelled. Two miles saved per day was the equivalent of 730 miles per year. Two hours per day was equivalent to sixty 12 hour days per year.

Table 10. The Effect of Labour Efficiency as Measured by Hours of Dairy Chores per Pound of Butterfat Produced.

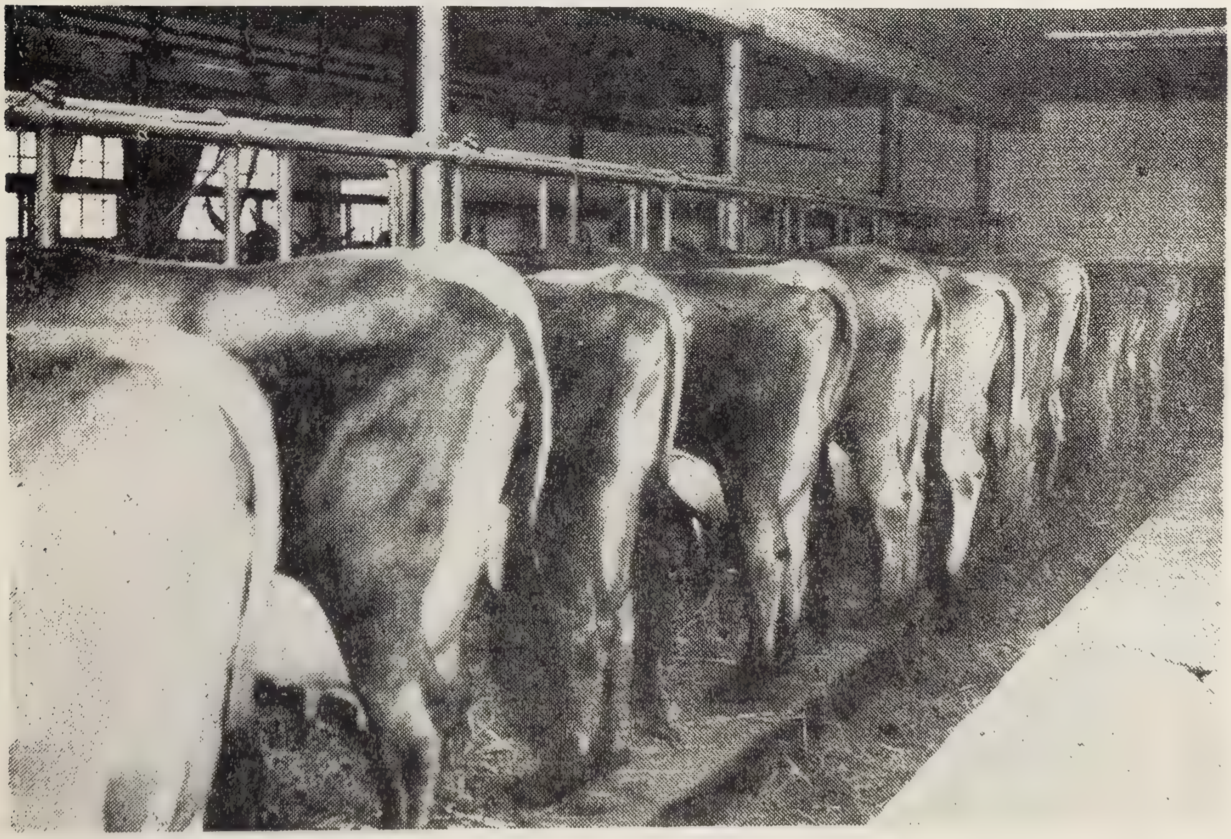
Hours of Dairy Chores per Pound of Butterfat Produced	Number of Farms	Average Labour Earnings	Cost per Pound of Butterfat	Average Hours per Pound of Butterfat	Cash Receipts per Man
		$	cents		$
Edmonton Churning Cream and Cheese Farms, 1941-42:					
Less than .8	30	1,133	34	.7	1,472
.8 to 1.1	23	812	36	1.0	1,459
1.2 to 1.4	23	665	42	1.3	1,286
1.5 or more	16	540	42	1.6	1,231
Rosemary and Coaldale Cheese Milk Farms, 1941-42:					
Less than .9	28	1,201	32	.7	1,587
.9 or more	22	920	36	1.0	1,290
All Cream Farms, 1942-43:					
Less than 1.3	26	1,533	49	.93	2,070
1.3 or more	22	1,224	71	1.57	1,730
All Condensery Farms, 1942-43:					
Less than 1.0	21	1,212	54	.75	2,121
1.0 or more	28	412	77	1.46	1,387

Capital Efficiency.—Measures of efficiency in the use of capital are based on the volume of products handled, in relation to the capital invested. This is sometimes called the turnover on capital and is measured by annual cash receipts per dollar invested. Since agriculture is based on biologic processes which cannot be speeded up by mechanical means, the rate of turnover on investment is relatively slow. Therefore, the years required before cash receipts would equal investment is sometimes calculated as a measure of efficiency in the use of farm capital. Its relation to earnings is given in Table 11.

Table 11. The Effect of Capital Efficiency as Measured by Years for Cash Receipts to Equal Total Capital, 1942-43.

Years for Cash Receipts to Equal Capital	Number of Farms	Average Labour Earnings	Cost per Pound of Butterfat	Average Total Capital	Hours of Chores per Pound of Butterfat
		$	cents	$	
Cream farms:					
Less than 4	21	1,954	50.3	15,105	1.03
4 or more	27	954	63.4	22,329	1.28
Condensery farms:					
Less than 3.7	24	1,021	60.0	9,654	.90
3.7 or more	25	499	69.4	16,048	1.26

It will be noted that years required for cash receipts to equal capital bore a marked relation to the operator's labour earnings. The cream shipping farms which required less than four years for cash receipts to equal capital had average labour earnings of $1,000 more than those who would require four years or more. The other groups showed about the same amount of variation.



The investment is heavy in dairying. Full and continuous production from it is essential.

SIZE OF BUSINESS

Measures of Size.—There is no one perfect measure of effect on labour earnings of size in farm businesses. One reason is that size depends on such unlike physical quantities as crop acres and numbers of animals, and the most desirable size is affected by prices and farm organization. The size required for best efficiency depends more on the size of the individual enterprises than on the general size of the farm as indicated by acres or labour requirements. However, there are several measures of the size of a farm business, all of which have some merit.

Table 12. The Effect of Size as Measured by Crop Acres, 1941-42.

Crop Acres per Farm	Number of Farms	Average Labour Earnings	Average Crop Acres	Crop Acres as Percentage of Total Acres	Percentage Receipts from Crops	Crop Index	Cash Receipts per Man
		$		%	%	%	$
Edmonton Churning Cream and Cheese Farms:							
Less than 100	18	409	71	36	12	113	967
100 to 199	32	803	133	53	5	103	1,335
200 to 299	22	697	250	65	16	100	1,421
300 or more	20	1,411	451	67	14	81	1,781
Rosemary and Coaldale Cheese Farms:							
Less than 110	24	1,118	74	35	26	98	1,343
110 or more	26	1,041	166	71	33	97	1,561

Acres.—One measure of size is the acres of crop-land per farm. The effect of size as measured by crop acres is shown in Table 12. An increase of crop acres was associated with higher labour earnings in churning cream groups during each year of the study, but in the groups of cheese-milk farms on irrigation, and condensery milk farms, increased crop acres were associated with lower earnings. The latter occurs whenever the average labour earnings are lower than prevailing wages.

Size of Enterprises.—While the size of the whole farm is important, its effect is dependent on its relation to the size of the various enterprises. The effect of the size of the dairy herd is given in Table 13 and the effect of the number of animal units in hogs is given in Table 14. In Table 13 it will be seen that the highest labour earnings are obtained on farms with the largest dairy herds. The second largest earnings were found in the Edmonton area on those farms having almost the smallest herds! The lowest earnings in the Edmonton area were where intermediate sized herds were kept. A decrease of earnings with the first increase of size and then a rapid increase as the enterprise reaches a relatively large size is usually found where other enterprises exist that are equally profitable or better. This is due to increasing efficiency with size of enterprise. In an area of good alternative enterprises, an operator may have no receipts from any one enterprise and yet derive moderately good earnings from other enterprises. There are certain overhead costs which are reduced on a per head basis, as the herd is increased; because the overhead cost is divided by a larger number of cows.

Table 13. The Effect of Size of Herd on Costs and Returns, 1941-42.

Number of Cows	Number of Farms	Average Labour Earnings	Net Cost Per Pound of Butterfat	Animal Units of Hogs per Farm *1
		$	cents	
Edmonton Churning Cream and Cheese Farms:				
Less than 7	28	767	39.4	14
7 to 9	26	820	38.2	12
10 to 12	16	708	38.2	13
13 to 15	13	778	36.8	14
16 or more	9	1,377	32.5	14
Rosemary and Coaldale Cheese Farms:				
Less than 5	15	886	44.9	6
5 to 7	21	1,037	35.5	8
8 to 10	8	1,267	24.3	8
11 or more	6	1,446	30.1	11

*1 An animal unit equals five hogs marketed.

Receipts per cow tend to average about the same regardless of size of herd. Thus the reduction in cost per cow would be reflected directly in the loss or gain per cow. Then when an enterprise is added that requires additional outlays of capital and labour and is too small to be efficient, the effect is to detract from earnings instead of adding to them, until the herd becomes large enough to attain an efficient scale of operation.

Table 14. The Relation of Size of Hog Enterprise to Various Factors, 1941-42.

Number of Animal Units of Hogs	Number of Farms	Average Labour Earnings	Average Number of Cows per Farm	Percentage of Labour Hired
		$		
Edmonton Churning Cream and Cheese Farms:				
No. hogs	6	240	14	3
1 to 4	15	219	9	4
5 to 9	19	599	10	6
10 to 14	17	902	8	9
15 to 19	12	742	11	13
20 or more	23	1,578	10	25
Rosemary and Coaldale Cheese Farms:				
No. hogs	4	582	6	4
1 to 4	10	927	5	7
5 to 9	25	1,065	6	12
10 or more	21	1,354	8	15

In Table 14 is given the effect of size of hog enterprise as measured by the number of animal units of hogs per farm. The cream farms with no hogs had better earnings than those with one to four animal units, or that would be the equivalent of less than twenty hogs reaching market. However, it is obvious that a hog enterprise paid well in the years shown if it was big enough and managed with average success or better.

COMBINATION OF ENTERPRISES

There is a long time tendency towards specialization in agriculture, because specialization helps to obtain high efficiency in production. Diversity has the advantage that by a combination of enterprises the by-product or idle working force from one enterprise may be profitably utilized in another enterprise. Since crop production is seasonal, the inclusion of live stock enterprises may provide some income in winter; whereas with crops alone there would be none. From the standpoint of a farm operator in Alberta, the decision concerning the best combination of enterprises usually is (a) the choice of the best paying enterprise for his particular farm, and (b) a combination of other enterprises with it which will utilize the by-products, labour and untillable land to the best advantage without interfering too seriously with the main enterprise.

Land too wet or rolling for cultivation, may be utilized by cattle or sheep.

Outside of whole milk areas around cities or irrigated districts the only areas where dairying is likely to be the best paying enterprise are where there is a high percentage of the land unsuited to cultivation due to rolling topography, stoniness, or lack of drainage. However, as an enterprise which fits well with best paying enterprises, without interfering too seriously, dairying is well worth considering. Its peak load of labour required is in winter rather than in summer, and at night and morning rather than through the day. Furthermore, dairying can utilize rough land and some by-products of cropping to better advantage than any other stock, where conditions are suitable for dairying. Studies made of ranches in Alberta simultaneously with dairy farms have indicated that the gross returns per cow from beef ranches are only about half those from churning cream herds. It must be remembered, however, that profitable dairy herds require an abundance of clean water at the buildings and pasture for a fairly large herd, close to where they are milked.

COMBINED EFFECT OF EFFICIENCY FACTORS

It is important to know what the combined effect of all the factors would be on the operator's labour earnings. For this purpose the best single measures available of each factor were selected and then the farm records were sorted on whether the farm was average or better on each of the measures of efficiency. In this way the farms were grouped as being average or better in no factors (0), one factor (1), two factors (2), three factors (3), and four (4) or five (5) factors, and the results are shown in Table 15 and in the graph on Page 4.

Table 15. Cumulative Effect of Five Farm Management Factors *1.

Edmonton District Farms, 1940-41.

Number of Factors High	85 Churning Cream Farms		25 Cheese Milk Farms	
	Number of Farms	Average Labour Earnings	Number of Farms	Average Labour Earnings
		$		$
0	8	–15	5	–98
1	18	170	6	276
2	18	538	7	345
3	20	726	2	488
4	16	1,218	5	1,984
5	5	2,472	....	....
High in Size Only	2	–683	1	–181

*1 FACTORS	MEASURE OF EFFICIENCY USED
(1) Live stock efficiency	Butterfat per cow
(2) Crop efficiency	Crop yield index
(3) Labour efficiency	Cash receipts per man
(4) Capital efficiency	Years for cash receipts to equal capital
(5) Size of business	Crop acres

In Table 15 it will be seen that the number of factors in which a farm operator excels has a very strong relation to his labour earnings. However, it is not easy to excel in all five efficiency factors. Few farm operators were average or better in all five factors. Reaching that point usually requires years of planning and improving. Since the business will only last the active lifetime of one man, it is very desirable that every new operator starting in should learn the best organization and goals for his particular farm as soon as possible in order that the necessary changes can be made. Farm accounts can help to indicate the weak spots and where improvements must be made for best results.

EDMONTON:
A. Shnitka, King's Printer.
1945